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1962

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# MISSOURI FORESTS

A READY REFERENCE  
FOR THOSE INTERESTED  
IN FOREST RESTORATION

U. S. DEPARTMENT OF AGRICULTURE  
FOREST SERVICE

IN COOPERATION WITH  
MISSOURI CONSERVATION COMMISSION

1943

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This publication was made possible by the combined efforts of a number of agencies and individuals, principally John R. Camp, Vico C. Isola, L. E. Childers, and others of the Washington office of the Forest Service; officials of the regional office of the Forest Service at Milwaukee, Wis.; the Central States Forest Experiment Station at Columbus, Ohio; State Forester George O. White of Missouri; I. T. Bode; and other officials of the Missouri State Conservation Commission.



481056

Area: 1/

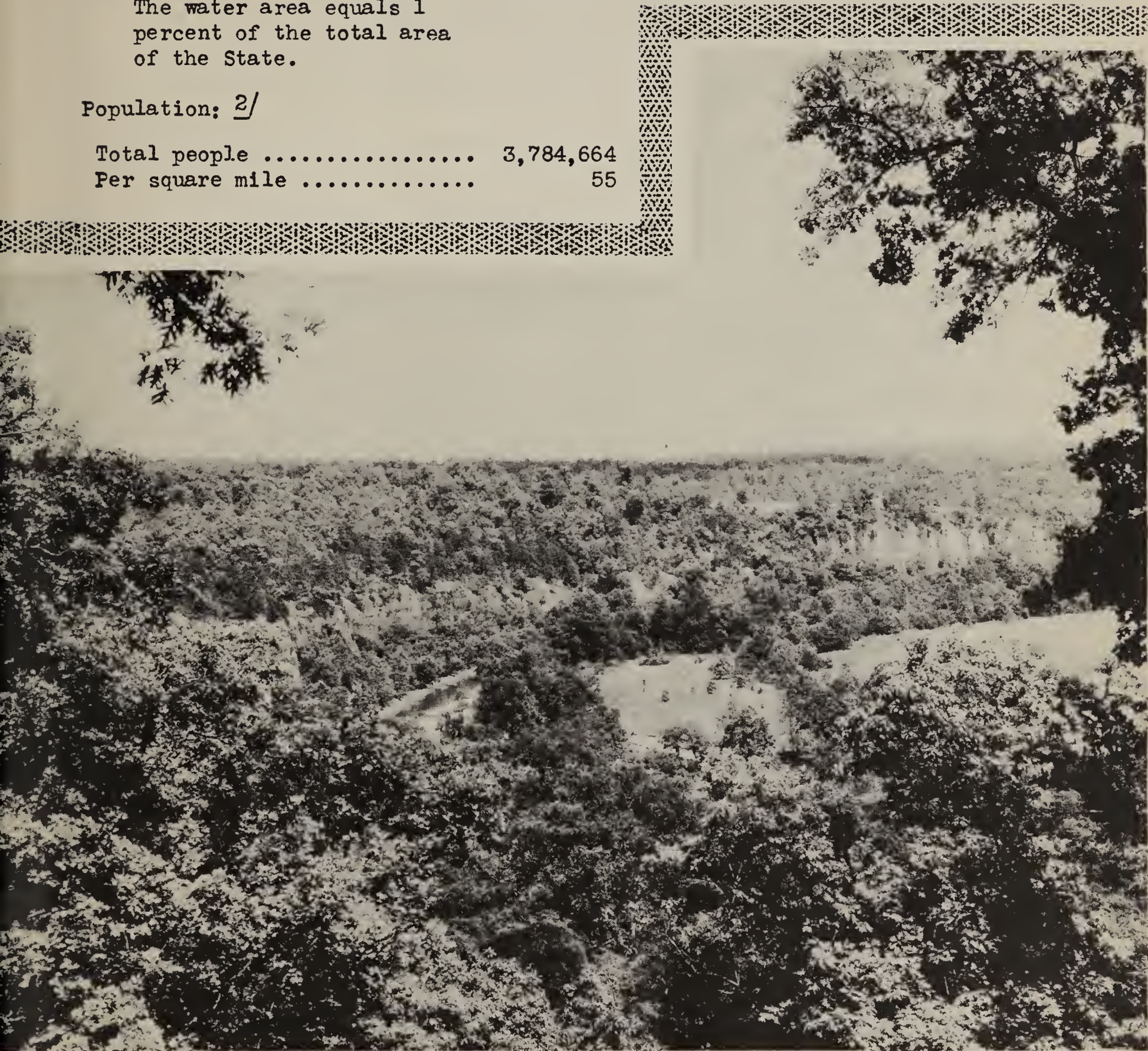
Land (acres) ..... 44,332,800  
Water (acres) ..... 433,580  
The water area equals 1  
percent of the total area  
of the State.

Population: 2/

Total people ..... 3,784,664  
Per square mile ..... 55

1/ Statistical Abstract of the United States.

2/ United States Census.



EXCESSIVE PRESSURE ON THE LAND in the Missouri Ozarks has created a bad condition that is of vital concern to every taxpayer in the State. The restoration and management of the forests of the Ozark region will aid materially in correcting this condition.

F-352392

MAR 15 1944



## THE LAND AND THE PEOPLE

People are the most valuable resource of any State. Their welfare, both individually and collectively, must therefore be the important consideration in any program of resource conservation.

Missouri's people live primarily on and by use of the land and the forests. Conservation of these resources presents major problems.

The 1940 census classified 1,823,968 persons, or 48.2 percent of the State's population, as rural. Of these, 1,108,000, or more than 60 percent, were "rural farm" dwellers. The two great centers, St. Louis and Kansas City, brought the urban total to 1,960,696, or 51.8 percent of the people.

But many of the urban dwellers, who live in 87 communities of more than 2,500 population, also make their living transporting, processing, or manufacturing the products of the land and the forests, and by performing services.

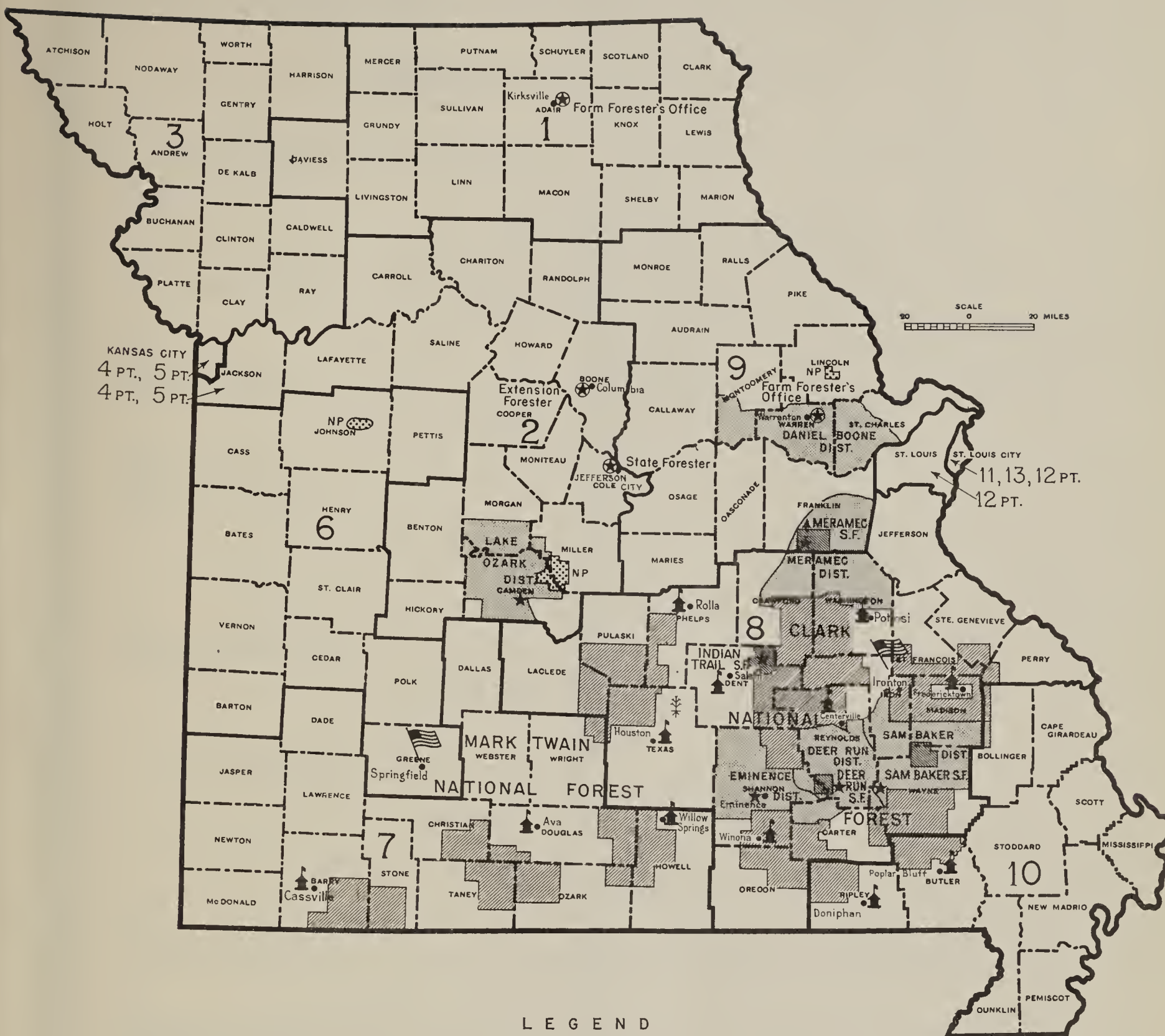
The land that is Missouri may be divided roughly into three great regions by means of concentric arcs running southwest-northeast. The first, beginning midway on the western boundary of Jasper County, would bulge in the middle to include the greater part of Benton, Morgan, and Cole Counties, and parts of Callaway, Moniteau, Montgomery, Warren, and St. Charles, then turn sharply southward to meet the Mississippi River near the northeast corner of Jefferson. The other would cut through the corner of Ripley County, bisect Butler, and follow fairly closely the northern boundaries of Stoddard and Scott to the Mississippi. (See map on cover page).

Region 1. The northernmost of these regions, characterized by glacial and loessial soils and including also the southwest Missouri prairies, is devoted largely to farming and grazing, although broken by wooded stream bottoms and with a considerable area of farm woodlands.

Region 2. The southeast section would include the rich alluvial Mississippi lowlands, once heavily forested, now almost entirely farmed with only scattered woodlands.







Region 3. In between the arcs would lie the Ozark Highlands characterized by steep slopes and soils of low fertility. So great is this area that its welfare is of first importance to the entire State. Here forests rank high in the economy. Restoration and maintenance of reasonable productivity on the timberlands are essential if they are to support their share of the population on a living level comparable to that enjoyed by people in other rural regions. That should be the objective of a long-time forestry program calling for the cooperation and aid of local, State, and Federal agencies.

# MISSOURI



## LEGEND

- 3 CONGRESSIONAL DISTRICTS
- NATIONAL FORESTS
- NATIONAL PARKS
- STATE FORESTS
- ORGANIZED FIRE-PROTECTION DISTRICTS

-  N. F. SUPERVISORS' HEADQUARTERS
-  N. F. RANGERS' HEADQUARTERS
-  MISCELLANEOUS STATE HEADQUARTERS
-  STATE RANGERS' HEADQUARTERS
-  NATIONAL FOREST NURSERY
-  STATE FOREST NURSERY



# MISSOURI FORESTS - AREA AND OWNERSHIP

Original forest area .....	31,000,000 acres <sup>3/</sup>
Present forest land (all classes) .....	15,588,000 acres <sup>3/</sup>
Equals 35 percent of total land area	
Federally owned forest land (national forests)	1,209,551 acres <sup>4/</sup>
Equals 3 percent of total land area and 8 percent of total forest land	
State-owned forest land .....	61,000 acres <sup>5/</sup>
Equals .0014 percent of total land area and .004 percent of total forest land	
(a) State forests .....	45,000 acres <sup>5/</sup>
(b) State parks .....	16,000 acres <sup>5/</sup>
(c) Game lands .....	
County and municipally owned forest lands ..	None <sup>5/</sup>
Private farm woodlands .....	8,903,000 acres <sup>3/</sup>
Equals 20 percent of total land area and 57 percent of total forest area	
Private commercial timberlands .....	5,414,449 acres
Equals 12 percent of total land area and 35 percent of total forest area	
Forest area covered by organized State fire protection .....	3,300,000 acres <sup>6/</sup>
Equals 21 percent of total forest area	
Forest area in need of organized protection	11,300,000 acres <sup>6/</sup>

<sup>3/</sup> Region 9, U. S. Forest Service

<sup>4/</sup> National Forest Reservation Commission

<sup>5/</sup> Missouri Conservation Commission

<sup>6/</sup> Division of State and Private Forestry, U. S. Forest Service



THE DEPLETED CONDITION of the forests result from (A) woods burning, (B) overgrazing, and (C) overcutting.

F-394464

A



F-237738

B



THE ORIGINAL FOREST AREA in Missouri - 31,000,000 acres - has shrunk to 15,588,000 acres. The remaining forests are greatly understocked with saw timber and carry a high percentage of defective and economically worthless trees.

F-352213

C





## IN BRIEF - THE FOREST SITUATION

The impact of civilization - of people living on and by use of the land and its resources, using them, misusing them, abusing them, neglecting them, and often exposing them to destruction through natural causes - has fallen heavily on Missouri's forests.

Once the woodlands covered 70 percent of the State's total land area. They were located in the Ozark Region, in the stream bottoms, and in a narrow strip extending north from Boone County. They contributed much to the upbuilding and enrichment of the cities and towns.

Now only approximately half of the original forest lands are still growing trees - the remainder are devoted to other uses. Not more than 150,000 acres of this is virgin timber. Inferior species have replaced much of the more valuable varieties of oak and pine in the second-growth forests. They contain also a large percentage of small sizes. Moreover, a tree count on a sample area in the Clark National Forest, representative of conditions generally, showed 60 percent fire injury and 68 percent defective from other causes.

The remaining forests are concentrated largely in the Ozark Region. In the history of this region, as of other forested lands of the State, crop agriculture has been the great competitor of forests for land use. The competition has been keen, and both the land and the forests have suffered. Land ill-suited to farming has been cleared of trees, farmed for a while, then abandoned. Misuse of the land and its resources is still common.

Uncontrolled burning, excessive cutting, and wasteful harvesting, without thought of the future, have taken their toll. Fires, usually set deliberately to improve grazing, can probably be considered the greatest factor in forest depletion, because of the destruction of litter, killing of seedlings, and damage to mature trees - fires are also an annual occurrence, whereas cutting is not. It is also significant that in 1909 the census listed more than 2,000 active lumber mills in Missouri; in 1936 there were only 216. Even with heavy war demands, the census shows only 291 in 1941.

All these things and other destructive practices have helped to deplete the forests. And now the main forest region is pock-marked with communities in which the resources are no longer adequate to sustain the people and their government and social institutions. While some owners follow good forestry methods, they constitute a very small minority.

See Note Opposite



Note:-

The figures on page 6, paragraph 5, last 2 sentences; and page 16, paragraph 2, last sentence, refer to mills cutting over 50,000 board feet per annum. The trends indicated are probably correct. However, in 1942 lumber production figures for Missouri were obtained not only by the Bureau of the Census mailing production report forms to all sawmills of record, but by personnel of the Forest Service obtaining production reports from mills who failed to respond to the mailed inquiry as well as from hundreds of mills not listed in any commercial or governmental directory of sawmills. This resulted in a 100% coverage for the first time, so the data cannot be compared with the incomplete statistics of lumber production for previous years.

For instance, Census statistics in Missouri for 1941 were:

	<u>Number</u>	<u>Production (M feet)</u>
Mills cutting less than 50M	203	4,167
Mills cutting over 50M	<u>291</u>	<u>109,267</u>
TOTAL	494	113,434

Similar but preliminary statistics for 1943 (100% coverage) are:





	<u>Number</u>	<u>Production (M feet)</u>
Mills cutting less than 50M	1,005	19,926
Mills cutting over 50M	<u>1,079</u>	<u>255,112</u>
TOTAL	2,084	275,038

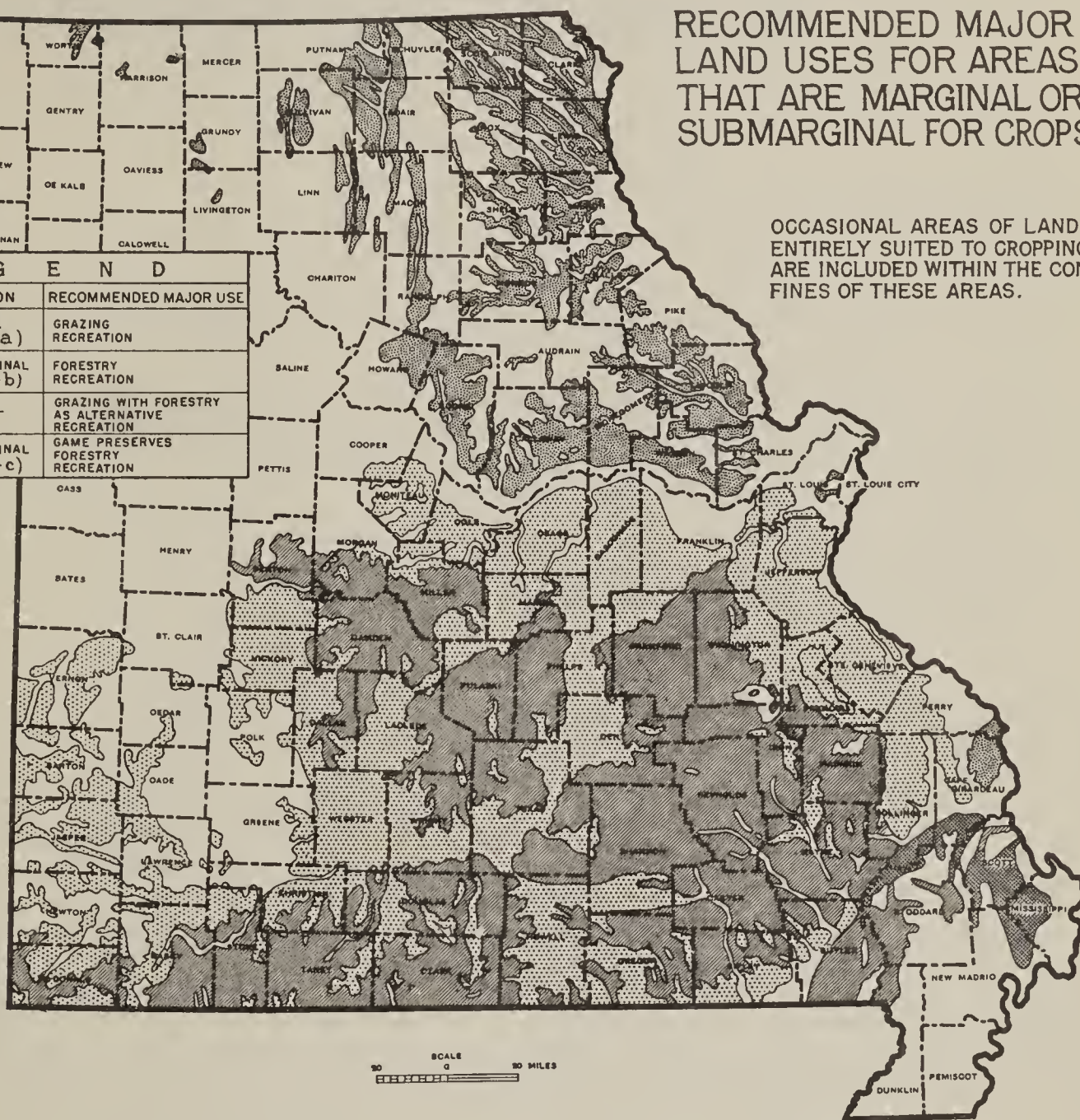
The difference is unquestionably due to the incompleteness of the 1941 data.





RECOMMENDED MAJOR  
LAND USES FOR AREAS  
THAT ARE MARGINAL OR  
SUBMARGINAL FOR CROPS.OCCASIONAL AREAS OF LAND  
ENTIRELY SUITED TO CROPPING  
ARE INCLUDED WITHIN THE CON-  
FINES OF THESE AREAS.

L E G E N D		
SYMBOL	CLASSIFICATION	RECOMMENDED MAJOR USE
	MOSTLY MARGINAL FOR CROPS (1-a)	GRAZING RECREATION
	MOSTLY SUBMARGINAL FOR CROPS (1-b)	FORESTRY RECREATION
	MOSTLY MARGINAL FOR CROPS	GRAZING WITH FORESTRY AS ALTERNATIVE RECREATION
	MOSTLY SUBMARGINAL FOR CROPS (1-c)	GAME PRESERVES FORESTRY RECREATION



1-a. Areas in which a substantial part of the farms are on lands of such low productivity that arable farming is uneconomic and undesirable, and should be replaced almost entirely by extensive grazing.

1-b. Areas in which a substantial part of the farms are on land of such low productivity that arable farming is uneconomic and undesirable, and should be replaced almost entirely by forestry. Occasional areas of land entirely suited to cropping are included within the confines of this problem area.

1-c. Areas now largely in forest cover which are distinctly submarginal for agriculture.





# FOREST RESTORATION

What of these wasted acres - these abused and misused lands?

Missouri needs a forestry program adopted, supported, and pushed by all the people so that lands best suited for forest growth are used for that purpose, and managed to produce in abundance forest products in such a way as to create and maintain a forest economy that will help solve problems of rural poverty and unemployment, and create added security and stability for labor, families, communities, and the forested areas.

Elsewhere in this publication appears an outline for such a program, but the outstanding needs are highlighted here. The three headings which follow could readily be broken down into many or could be combined into one and titled, "Conservation of Forest Resources." For the sake of clarity the three headings are used, but it should be constantly borne in mind that they are so closely related that to attempt any one project without the others would fail to constitute a complete forestry program. Their order of importance may vary with specific conditions, but they all make up the whole.

## 1. Forest Protection

Protection of the forests from fire, insect and disease attacks, and overgrazing. The objective of forest protection in Missouri should be to so perfect all types of protection, and especially fire protection, that forest holdings become insurable at reasonable rates.

## 2. Public Acquisition

Community, State, and Federal acquisition of lands sub-marginal for private ownership; those necessary for the protection of the public interest; and those where for any reason private ownership cannot or will not function in the public interest.



### 3. Public Control

Sufficient public control in return for public assistance to private owners, and because of public interest in private forests, to insure that destruction and deterioration of forests will be stopped, and that privately owned forest lands will be so managed that they will (a) be kept reasonably productive; (b) insure reasonable watershed protection; (c) help safeguard local communities.



F-352371

LAND OF LOW FERTILITY. Such land had better be left in timber or be devoted to grazing. If cultivated, it will produce only meager yields of farm crops, erosion will take its toll, and eventually it is likely to be abandoned.

The trees have been girdled as a quick means of clearing the land. The brush and smaller trees were cut and burned.



## OZARK SOCIAL-ECONOMIC CONDITIONS

Depletion of the forest resource has affected seriously the social and economic life of the people in the Ozark Region.

In the discussion of any conditions or in the application of any statistics it must be constantly borne in mind that the discussion and the application must be general and never refer to any specific spot or individual. In considering the Missouri Ozarks it is known that there are many good farms and well-managed lands which are automatically excluded from consideration unless they are used as examples of what has and can be done.

Thirty-five Ozark counties are suited mainly to forest production rather than to farming; even now 64 percent of their land is in forests. Once these counties supported fine stands of oak, pine, and hickory. Now they have only a small amount of their former timber volume. Forest industries which once flourished and provided a livelihood for many workers have vanished or are operating on a much smaller scale.

Before the war decline of the forest industries had resulted in a loss of nearby markets for farm products and opportunities for winter employment in the forests. With decline in forest employment, the local demand for hay to feed the work stock of woods workers fell off, even before gasoline power displaced animals in the woods. Hay is an important farm commodity in the region. The use of fewer horses and mules generally in the cities and towns caused further depreciation in the market. Farm as well as forest incomes in the region had therefore suffered. In 1929 the average gross return reported from 13,000 farms in Ozark counties was less than \$600.

Low incomes were reflected in high relief rolls. Prior to the war, up to 20 percent of the rural families in these Ozark counties required public aid. Federal, State, and county agencies spent \$11,236,703 for relief in the 35 counties in the years 1932 to 1936.

Economic conditions also are reflected in property values, tax payments, and bonded indebtedness, the latter often growing out of accumulated unpaid county warrants.

On a per capita basis the assessed value of real and personal property in the Ozark counties is only a fraction of that in some farm and urban counties. Average per capita values, for example, of counties A and B in the Ozark Region were only \$432 and \$685, respectively, from 1930 to 1934. In comparison, respective values of counties C and D in the farming region were \$2,000 and \$1,468.





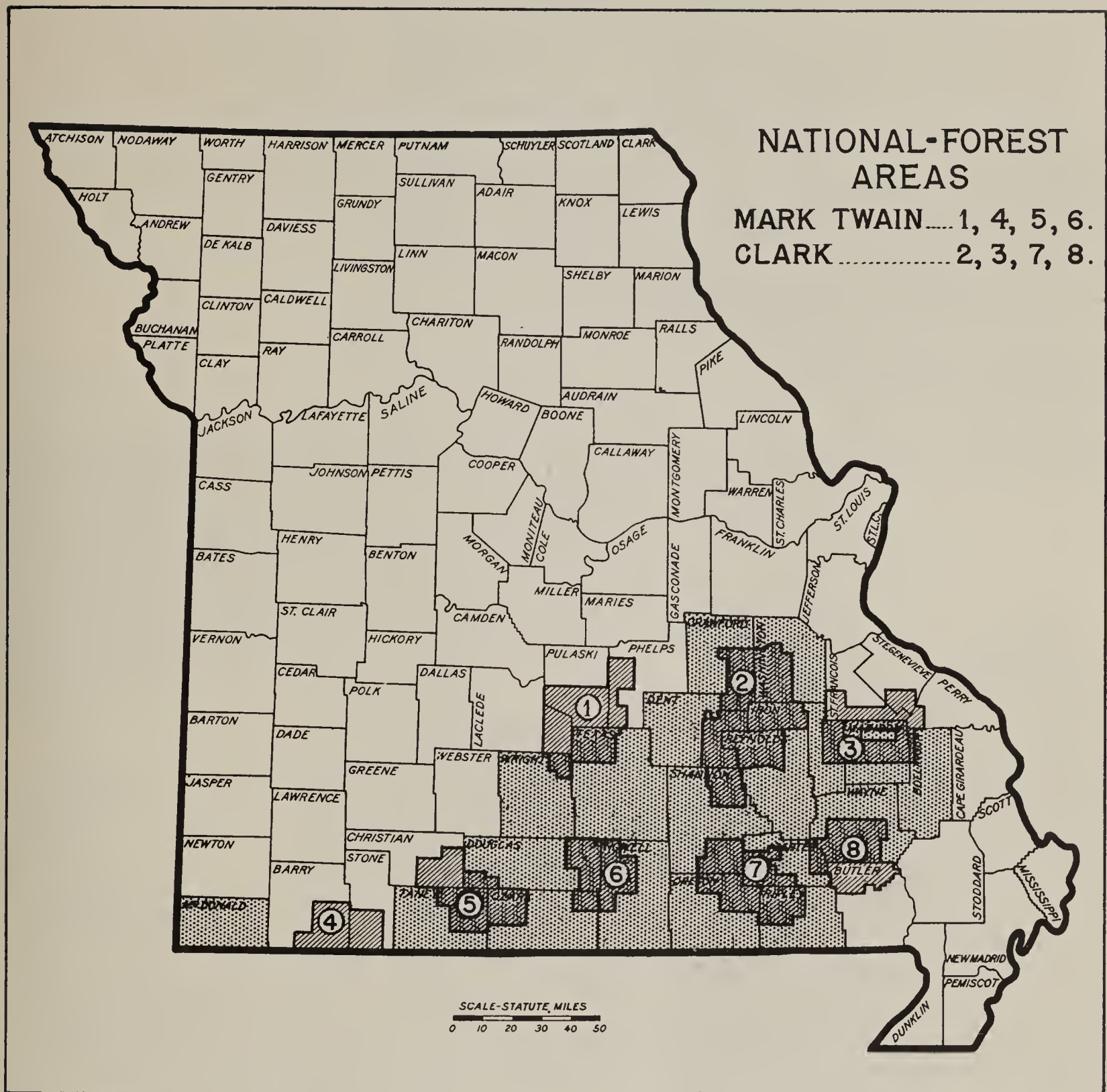
While the situation has probably improved somewhat lately, assuming Missouri followed the national trend, property tax delinquency in the Ozark Region was extraordinarily high in depression years. In 10 counties 35 percent of the current taxes was uncollected in 1934 compared to an average of 19 percent in northern farming counties. There was also much more long-time delinquency. In 14 Ozark counties 41 percent of the land was delinquent for 1 year or more; 22 percent for 2 years or more; 11 percent for 3 years or more.

Although Ozark counties in Missouri have less than 25 percent of the total assessed valuation, their bonded debt was 44 percent of the total bonded debt of all rural counties in the State.

Roads, schools, and other essential institutions and services have suffered as a result of depleted forest values. County A again offers a good example. The original rich forest capital of this county has been largely dissipated. Expenditures for such services as those mentioned amounted to only \$8.41 per capita annually during 1930-34 in this county. During the same period County C, mentioned before, spent \$25 per capita for the same things. Such expenditures are a measure of the ability of the people to pay and an indication of the extent to which the resource has been abused.

School children suffer when local governments cannot provide adequate educational facilities. In Counties A and B a recent study shows that teachers' salaries are lower, teachers have poorer training, children drop out of school at an earlier age, and illiteracy is much greater than in counties where the natural resource or resources have not been dissipated.





Over 40 percent (13,600) of the farms in 19 counties (above) provided their operators an average of less than \$600 gross income in 1929. These counties are predominately forested and the land has a low agricultural productivity. Despite this, there was an increase of 13 percent (4,265) in the number of farms in these counties between 1930 and 1935.





F-352248



F-389178



F-352239

FOREST DEPLETION  
in the Missouri  
Ozark highlands  
is largely re-  
sponsible for a  
living standard  
below the nation-  
al average.



Continuous supplies of timber also assure stable industries which contribute to steady employment and taxes for support of local government, schools, and other institutions.



Forests so managed as to assure a perpetual supply of timber offer steady employment to local people in the woods and in the mills and factories.

F-352412



## LUMBER PRODUCTION AND CONSUMPTION

Production trend is down <sup>7/</sup>



1899



1936

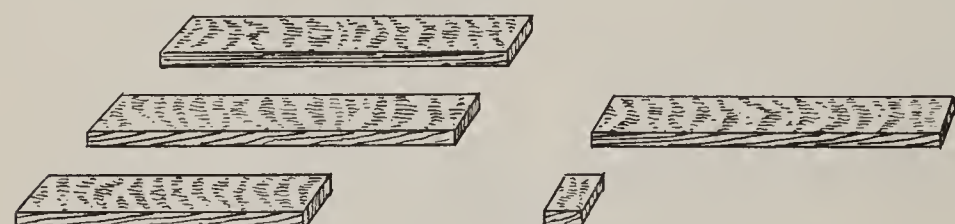
723,754,000 board feet produced in 1899.

89,173,000 board feet produced in 1936 (55,-588,000 board feet of this was consumed in the State). Heavy war demands brought this up only to 109,000,000 board feet in 1941 (94,-000,000 board feet was consumed in the State).

See Note Page 6

(Each full lumber pile equals 100,000,000 board feet)

Consumption trend is down



1922

1936

271 board feet per capita in 1922.

110 board feet per capita in 1936. 177 board feet per capita in 1941 (stimulated demand).

(Each board equals 100 board feet)

Before the war at least, the total volume in hewn ties, poles, posts, fuelwood, and other timber commodities produced annually in Missouri was probably equal to or more than the volume of lumber, but varied so much that figures on these products are not a good index of trends. Lumber offers the best yardstick.

The record year for lumber production in the State was 1899, when the total reached 723,754,000 board feet. General economic conditions and other factors should, of course, be considered in any comparison of production figures of one year with another, however, it is significant that during the present century production in Missouri has declined steadily.

Consideration of consumption and import figures should also be tempered with understanding. Consumption figures represent not only the lumber used locally but also that manufactured and transshipped to other areas, which in Missouri is quite large. Imports in part result from the misuse and depletion of the local forest resources. On the lumber from outside surplus producing regions people must pay costs of

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<sup>7/</sup> Division of Forest Economics, U. S. Forest Service.





F-352408

OLD-GROWTH HARDWOODS. A stand, mostly white oak, in the Clark National Forest. Missouri forests, restored to a productive condition and protected from fire, could again be made to yield high-quality logs and other wood products for use of the people.



transportation which results in higher prices for lumber. Also, under any circumstances, Missouri would always import some lumber to meet special needs and uses and would export some lumber just as it does at the present time even with imports at a high level. With these things in mind, the following figures are indicative of the present situation:

#### In 1936

Consumption of lumber amounted to 435,000,000 board feet. Importations totaled 379,500,000 board feet, of which some 377,500,000 board feet were from other States, the remainder from foreign countries.

Figured at \$25.73 per 1,000 board feet (the average mill price of sawed lumber in Missouri in 1936) the output from the forests of the State brought producers approximately \$2,294,000.

On the same basis and assuming that all the lumber imported was actually consumed within the State, the people paid \$9,764,000 for lumber from outside sources. Actually the price paid by residents for that part of the imports consumed by them was probably higher than the average mill price.

At \$3 per day and 4 man days per 1,000 board feet from stump to finished product, or \$12 per 1,000 board feet labor cost, a total of \$4,554,000 was paid to workers outside the State to produce the lumber imported. As previously explained, under any circumstances there would be some imports and exports. Assuming, however, that the imported lumber or lumber equally valuable and useful could have been produced locally, such a pay roll would have given \$500 a year to each of more than 9,000 families.

#### In 1941

Consumption of lumber was 669,000,000 board feet. Importations, all from other States, amounted to 575,000,000 board feet.

#### Lumber Cut Exceeds Growth

Growth of timber in Missouri forests is estimated at 25 board feet per acre per year, but only 5 percent of this growth is on trees which would make sawlogs now. Applied to the total acreage of forest lands, these averages show saw-timber growth at about 19,485,000 board feet annually. Because some forest lands are permanently in recreational use or are too rough to be considered for commercial timber production, the actual total growth may be considerably less. It is significant, however, that the rate of cutting trees for lumber, as indicated by the 1936 production, is about five times the rate of growth, and as indicated by 1941 production is even greater.





F- 31768

STAVE BOLT CUTTING,  
Butler County. To  
prevent further  
forest depletion the  
production of any  
specialized product  
such as staves should  
be accompanied by the  
use of the remainder  
of the tree.



F-352359

MUCH OF THE ORIGINAL PINE forest of Missouri resembled this tract  
of pine along State Route 19 north of Eminence in Shannon County.  
Should man be allowed to lay waste such timber without regard to  
the public interest in the resource?



## GROWING TIMBER FOR LOCAL MARKETS

Granted that under normal marketing conditions there would always be some exports and imports and interchange of products with other regions, Missouri forest lands are nevertheless extensive enough to supply lumber and wood products equal to all the needs of the State's people. They would, if fully productive, provide a surplus above local needs for export to nearby non-forest regions.

Growing Capacity - Although the soils of the Ozark counties are too stony, low in fertility, and hilly for profitable farm crop yields, they will support trees. Moreover, the rainfall, temperature, and other climatic factors are favorable to fairly rapid growth of valuable timber species.

Growth data are not available, but observations by foresters and experienced woodsmen indicate that 120 board feet per acre per year in commercially desirable saw timber is not too much to expect from well-stocked Ozark lands.

Assuming 10,000,000 acres available for commercial timber production - a reasonable estimate since this is only two-thirds of the total forest land area, practically all of which is considered capable of producing commercial timber - then 1,200,000,000 board feet could be produced annually if the forests were well-stocked and productive. Yields of other forest products might be increased proportionately.

Markets for Lumber - Since building operations were on a comparatively low level in 1936 it seems reasonable to assume that normal lumber consumption would average somewhat higher than in that year. If it averaged 200 board feet per capita, 755,000,000 board feet of lumber would be required annually to meet the needs of Missouri's 3,784,664 people. Even if the State imported no lumber for special needs, a balance of 445,000,000 board feet of lumber would be available for market outside the State. And the nearby Prairie States - Kansas, Nebraska, and Iowa - will never produce lumber enough to meet their own needs. The short haul and therefore low transportation costs would put Missouri lumber in a favorable competitive position on the markets in these areas.

If the total annual production of 10,000,000 acres, amounting to 1,200,000,000 board feet, could be sold at a price equal to that prevailing in Missouri in 1936, it would return approximately \$30,875,000 compared to \$2,077,000, the estimated value of lumber produced in the State that year.





F-251643



F-393471

Top.--Transporting logs to the mill.

Above.--Constructing telephone line  
for use in fire protection.

Right.--Thinning and other stand  
improvement operations pro-  
vide employment

F-352296



ALL ALONG THE LINE from the forest to the consumer there are jobs to be done that spring directly or indirectly from productive forest lands.



## EMPLOYMENT IN PRODUCTIVE FORESTS

Employment for large groups of workers would be provided by 10,000,000 acres of commercially productive forest lands.

In the farm woodlands (assumed to contain 6,000,000 acres of productive forest lands) it is estimated that 12,000 Missouri farmers might find part-time work (three months per year) in the preparation of logs and other products for the processing plant, and in cutting and working up waste timber for fuel, hewn material, and fence posts to be used on their farms or to be sold. The forest crop, unlike most farm crops, is not perishable. The work in the woodlands could therefore be done during the winter and at other times when farm work ordinarily is slack.

Similarly, the industrial forest holdings and public land holdings, not devoted to special uses, estimated to contain 4,000,000 acres of commercially productive forest land would offer part-time employment to 8,000 people in logging and in thinning and improvement cuttings and in the production of hewn ties, piling, pulpwood, and other forest products.

It is further estimated that at least two man days work is required to manufacture logs into 1,000 board feet of finished lumber. The possible future yields of the farm woodlands, the industrial forest holdings, and the national forests after restoration to full production of 1,200,000,000 board feet, would therefore provide full-time jobs (250 days per year) for 9,600 men in the lumber industry alone.

The possibilities of employment from productive forests are not limited to work in the woods and the mills. In the construction of trails, firebreaks, and lookout towers, and other fire-prevention operations; in the building of service roads and bridges; in recreation services; in the transportation of lumber to consuming areas; and in many other fields there are jobs to be done that spring from productive forests.

Productive forests in Missouri would provide employment largely in the Ozark Region where added income is greatly needed by the people, where relief expenditures during the depression years were greatest, where the level of per capita wealth is at present low, where tax delinquencies are high, and where added wealth and income would help support better schools, roads, churches, and other public services and institutions.





F-352233



F-335374

Top.--LOGGED-OVER FOREST LAND in Missouri showing wasteful cutting, fire-scarred trees, lack of reproduction, insufficient cover, and what cover there is of inferior or poorly formed trees. What chance has this area to remain productive or carry its share of taxes?

Bottom.--FARMERS ARE VITALLY INTERESTED in the preservation of the land and in having each acre of land produce the maximum which it is capable of producing without depleting the soil. Sustained forest yields are an important part of any well-regulated agricultural pattern.

Isn't it time the people of Missouri assert their interest in management of the forests to conserve remaining supplies and insure supplies for the future?





# PUBLIC CONTROL

## PUBLIC INTEREST IN ALL FOREST LANDS

Under the laws of this country the forest owner has the right to do pretty much as he pleases with his land and the forest crop. If he wishes to clear-cut it, with no thought of future yields, he may - if he wishes to burn it over, he may, so long as the fire does not escape to other property - if he wishes to use it or abuse it in anyway, he may. That is the rural situation.

Now to compare rural land ownership with land ownership in urban areas. An urban property owner must clear his sidewalk of ice and snow. He must dispose of rubbish. He is subject to fire marshall inspection and even police. He is under all sorts of rules, regulations, and expenses on his property not because it is of a direct advantage to him but because it is a protection to his neighbors and his community. For all this the urban owner receives certain direct benefits such as fire and police protection, street construction, maintenance, etc.

Forest lands that become unproductive cease to support adequately the individuals attempting to make their living thereon. When this happens such lands immediately become a public problem. Their mismanagement has finally reached the point where not only the owner is affected but many other individuals as well. The owner of this land cannot pay his taxes, which means that other people (largely urban) must assume the extra tax burden. The owner of this land can no longer support his family which means that others must support them. Because of mismanagement, the owner of the land has increased floods - his land washes away - and the public must pay for flood control measures, stream dredging, and erosion control.

This owner of rural property has not been placed under the same, or similar rules and regulations that the urban dweller has been forced to accept for the protection of his neighbors and his community. Why shouldn't he and all other timberland owners be required to so handle their holdings that they will never become a public liability and can always carry their share of the community burden?

Is it not time for the people of Missouri to assert their interest in the management of all forest lands so that remaining supplies can be conserved and future supplies insured? In return for this owner cooperation in conservation - public control, if we must give it a name -- the public must assume certain responsibilities, such as fire protection, equitable taxation, cooperative marketing etc., just as in the case of the urban dweller.



## Missouri National Forests

## State-owned Forest Land

Names: Clark and Mark Twain

Gross area..... 3,321,513 acres

Net area approved for  
purchase..... 1,209,551 acres  
Cost \$2.23 per acre..... \$2,694,674.93

Net area to be acquired  
in established units..... 1,799,912 acres  
Cost \$2.78 per acre..... \$5,003,755.36

Total proposed acquisition  
in established units.... 3,009,463 acres  
Cost \$2.57 per acre..... \$7,698,430.29

State forests...45,000 acres  
State parks.....16,000 acres  
Total.....61,000 acres



F-352268

ENTERING THE CLARK NATIONAL FOREST, Missouri. Private forest lands submarginal for private interests and those where for any reason private ownership cannot or will not function in the best interests of the public should be acquired by community, county, State, and Federal governments.





# ACQUISITION

## PUBLIC FORESTS - PRESENT AND FUTURE

Present cooperative programs attempt to encourage the management of woodlands and forests in the State by private owners. This program should be continued and enlarged. However, in spite of the effort to assist the private land owners to manage their forests properly, there are large areas of forest lands which do not appear to offer sufficient financial return to interest the owners in maintaining good forest practices.

In view of the many risks involved for the individual in the practice of forestry on a considerable acreage of the forest land, the planning agencies in the State have come to believe that public ownership of a large proportion of the woodlands which are not part of farms is desirable. These lands would make up both State and Federal forests.

Various estimates of the acreage in Missouri which should be in public forests have been made. In 1934 the State Planning Board recommended that 7,000,000 acres of forest land ultimately should be considered for public ownership. Since this recommendation was made, the desirability of the State taking part in the acquisition and management of a substantial share of this land has been emphasized.

Forest Work Program: If the action of the State and Federal Governments makes possible the acquisition of sufficient land to make the public ownership equal 7,000,000 acres, Missouri will be able to employ many of its residents upon worth while work of a long-time investment nature. Estimates of possible work loads on the above amount of public forest ownership are as high as 40 million man days.

The comprehensive restoration of the forests in Missouri will be accomplished only over a period of years. A number of considerations will have a bearing on just when particular parts of the program shall be begun and just when they should be pushed with greatest vigor. In general, greatest expenditures of funds and efforts should be deferred to unemployment and depression periods, leaving for prosperity periods, only maintenance and the extension of acquisition.





F-389158

CATTLE GRAZING in typical glade areas of the Missouri Ozarks. Indications are that forage yields of the Ozark lands generally can be increased greatly under protection and with proper management.



F-380513

OVERGRAZING AND ANNUAL FIRES in the Missouri Ozarks may leave little more than rocks and bare ground.



## FOREST RANGES

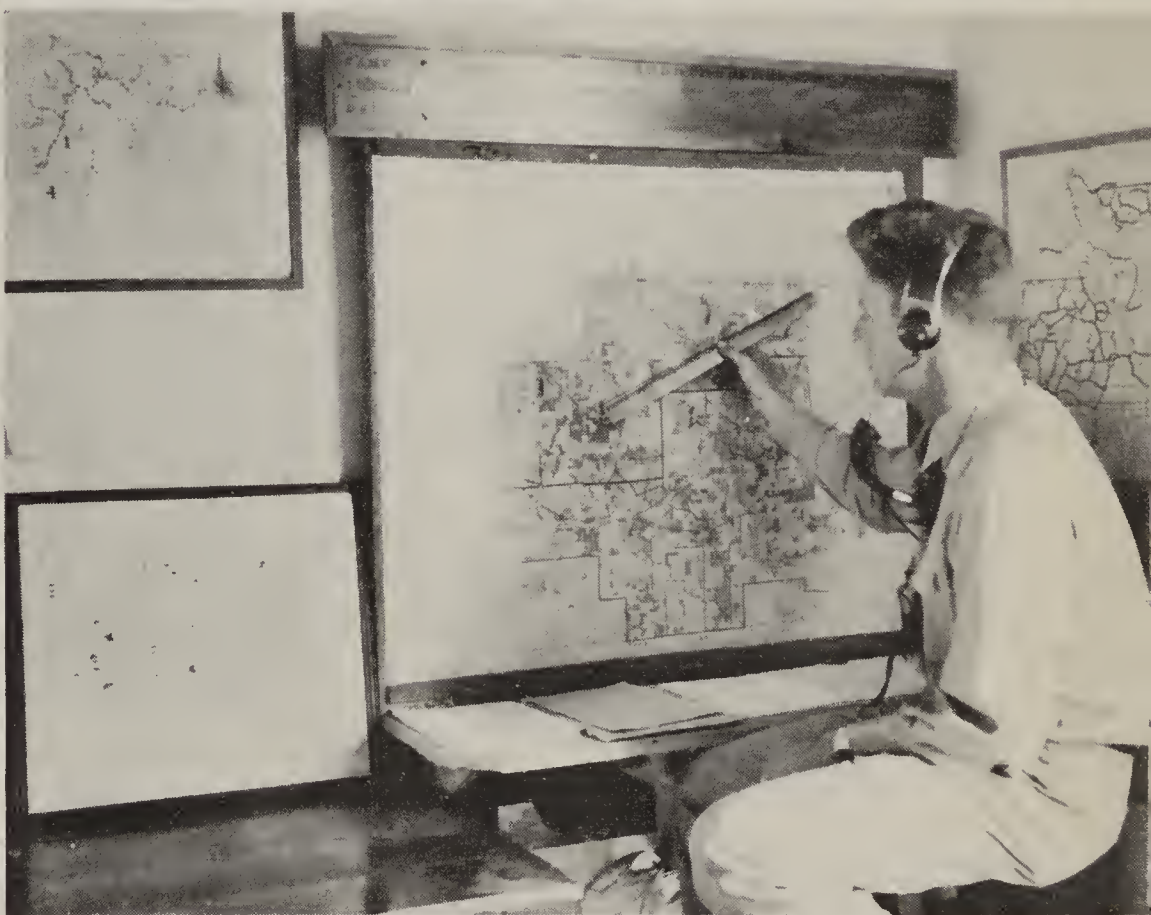
In the Missouri Ozarks and the similar contiguous region of northern Arkansas it is estimated that 25,000,000 acres of forest lands are grazed by cattle, hogs, sheep, and goats. Grazing of such lands is likely to continue to be a major phase of the local agriculture. Grazing use must therefore be correlated with timber growth in any restoration of resources. Under proper management the forage resources may aid materially in sustaining the people until incomes can be further supplemented by employment in the woods and timber-utilization industries.

Damage to the ranges has been excessive. As the timber resource was dissipated, the people turned to the livestock business to increase their incomes. The forests generally are open range. Cattle graze out all year and hogs roam the woods grubbing out the roots of young trees and forage plants and harvesting the occasional mast crop. Goats are also used to clear brush. Economic pressure on the people has resulted in overgrazing, and grazing too early in the spring has also taken toll of the resource, the native highly nutritious perennial grasses and forage plants giving way over large areas to poor annual species. Burning of the woods has also been practiced quite universally under the erroneous impression that grazing would thereby be improved. Soil erosion and floods have added to the damage.

Observation in the Ozark Region indicates that the potential grazing capacity of the glades scattered through the forest areas is far above present yields. It is known from studies of areas within the national forests which have been placed under regulation that forage in glade areas has a great inherent capacity for recovery if depletion is not too far advanced. Information on which range-management practices in the region can be based is badly needed. The basic data can be obtained only through intensive research.

Investigations should be started without delay, efforts by State, national, and private agencies being coordinated to supply landowners and managers with facts that will enable them to fit grazing use to the productive capacity of the land; to know proper seasons of use of the range for best results; and to correlate grazing with the management and use of other important resources - timber, watershed, wildlife, and recreational values.





F-352150

F-352231

Upper right.--QUICK ACTION ON A FIRE is essential. This crew got on the fire when it was still small and with back-pack equipment will soon have it out. Fire protection is timber-growing insurance; it makes forest improvement profitable. It is vital to any program of forest restoration.

Left.--FLOYD LOOKOUT TOWER on the Clark National Forest. The State Conservation Commission and the Forest Service have built 87 such towers in Missouri to insure quick detection of fires.

Lower right.--FOREST FIRE DISPATCHER to whom all fires on the ranger district are reported. Crews are then sent out to control the fires.





# FIRE PROTECTION

Fire protection is vital to forest production. Without adequate protection, there can be no assurance of a continuing yield of forest crops. Burned forests employ no labor and pay no taxes to support schools and government.

Fires in the Ozark Region of Missouri are largely man-caused. Many of them start as a result of "burning the woods" with the idea of improving grazing. Such fires damage and destroy mature timber and kill the young trees which will produce the future timber crops. They lay the land open to erosion. They are destructive of wildlife; and it has been observed that as a permanent practice such burning also tends to destroy the grazing resource.

Adequate fire protection is now being given to only a small percentage of Missouri's forest lands. The national-forest areas are under protection, but there are also more than 11,300,000 acres additional of State and private lands that should be similarly protected. In 1940, approximately 3,300,000 acres of these State and private lands were under organized protection, leaving a balance of 8,000,000 acres unprotected. (The figures given include some watershed and range lands not classified as forest lands.)

Because Missouri has until recently lacked a State conservation department, the State and private owners have not been able to take advantage of the provisions of Section 2 of the Clarke-McNary law which provide for State-Federal cooperative protection. However, in 1940 under the provisions of this act State and private funds spent in Missouri totaled \$15,500. The Federal Government matched these expenditures with an equal amount, making a total of \$31,000 available for fire protection purposes.

Missouri is not as wealthy as some States with comparable forest areas, such as Pennsylvania and Michigan. However, in both wealth (assessed valuation of property) and in forest area needing protection, the State compares favorably with South Carolina, Tennessee, and Virginia. Expenditures in all three of these States for forest protection in 1940 were much more than in Missouri.

Missouri has much to gain by adequate protection of her forests. Estimated at 2 1/2 cents per acre, the cost of protecting the 11,300,000 acres of State and private forest lands would total \$282,500 annually. Assuming, however, that 8,000,000 acres of the forest land in the State ultimately passes into public ownership, only 7,500,000 acres of private lands will remain to be protected at a cost of \$187,500 annually.





F-395389

LAND NO LONGER FIT FOR FARMING. Cleared of its original forest cover, it supported a family for a while until erosion took away the thin topsoil. Now the farm has been abandoned and Nature has begun the long, slow process of restoring a cover of grass and timber. Such land is best suited to forest production and should never have been cleared for farming.



## WATER CONSERVATION, FLOOD CONTROL, SOIL DEFENSE

Properly managed forests exert a major influence in the conservation of soil and water, regulation of stream flow, and flood control. To those who read Nature's signs, gullies, muddy streams, exposed rocks and subsoil, and alternating floods and dry streams are warnings of depleted resources and of continuing deterioration through action of water run-off.

In Missouri lie parts of three major drainage basins - the upper Mississippi, lower Mississippi, and Missouri. Each of these is divided into major and minor watersheds, the most important of those in the Ozark Region being the Osage, Meramec, Gasconade, and White. Run-off from some of the drainages in the State approximates 38 percent of the rainfall. Because of heavy run-off, floods are more severe and flood peaks are higher.

The amount and nature of the run-off is closely related to vegetative cover. Fire destroys trees and plants whose sheltering leaves and network of roots protect the soil and hold it together. Overcutting combined with fires and overgrazing has caused the water holding leaf mold to dry out or be destroyed--the soil alternately washes and bakes, gullies form and grow. Overcutting, burning, and overgrazing of the forests result in vegetation and soil depletion which allow the rain and snow water to rush unchecked toward the sea. Stream flow is therefore irregular and erratic. Streams silt up, aquatic vegetation is destroyed, ground water levels are lower, too, and wells and springs run dry when water is most needed. Fish cannot long maintain themselves in such streams. Efficient operation of water-power plants also depends on a continuous head of water.

Water run-off from bare soils or soils without adequate cover carries with it the rich topsoil. Such erosion increases as the speed of run-off increases. Erosion is a serious problem in Missouri. It is estimated that from two-thirds to three-fourths of the cultivated rolling uplands have lost one-half or more of their original surface soil. Where 50 percent of the timber has been removed it is estimated that one-fourth of the topsoil has washed away. Efficiency and value of dams and reservoirs are gradually being destroyed by excessive siltation. In 1927 it was estimated that 11 percent of the silt load of the Arkansas River was carried from the Ozarks by the White River.

Better management of existing forests through adequate fire protection and proper cutting practices, extension of forest and woodland areas to include lands (submarginal for agriculture) which are subject to severe erosion, and restoration and control of grazing resources would do much to check floods and erosion. Forest litter acts as a shield against the rain and also maintains conditions favorable to absorption. Tests have shown that fully stocked oak stands in the Ozarks absorb water more than six times faster than burned-over oak woods.



STREAMS IN MISSOURI produce only a small percent of the fish that they are capable of producing. Restoration of the forests will result in stream flow and food conditions more favorable to fish.



SQUIRRELS, RABBITS, AND QUAIL are extremely important game animals in Missouri. Proper forest management will see that conditions are right for their propagation so that they will become a part of the resource.

F-164527



F-382515

WILD TURKEYS are still present in small numbers in the forests of Missouri. Under suitable conditions their number could be greatly increased.

F-354215





## RESTORATION OF FOREST WILDLIFE

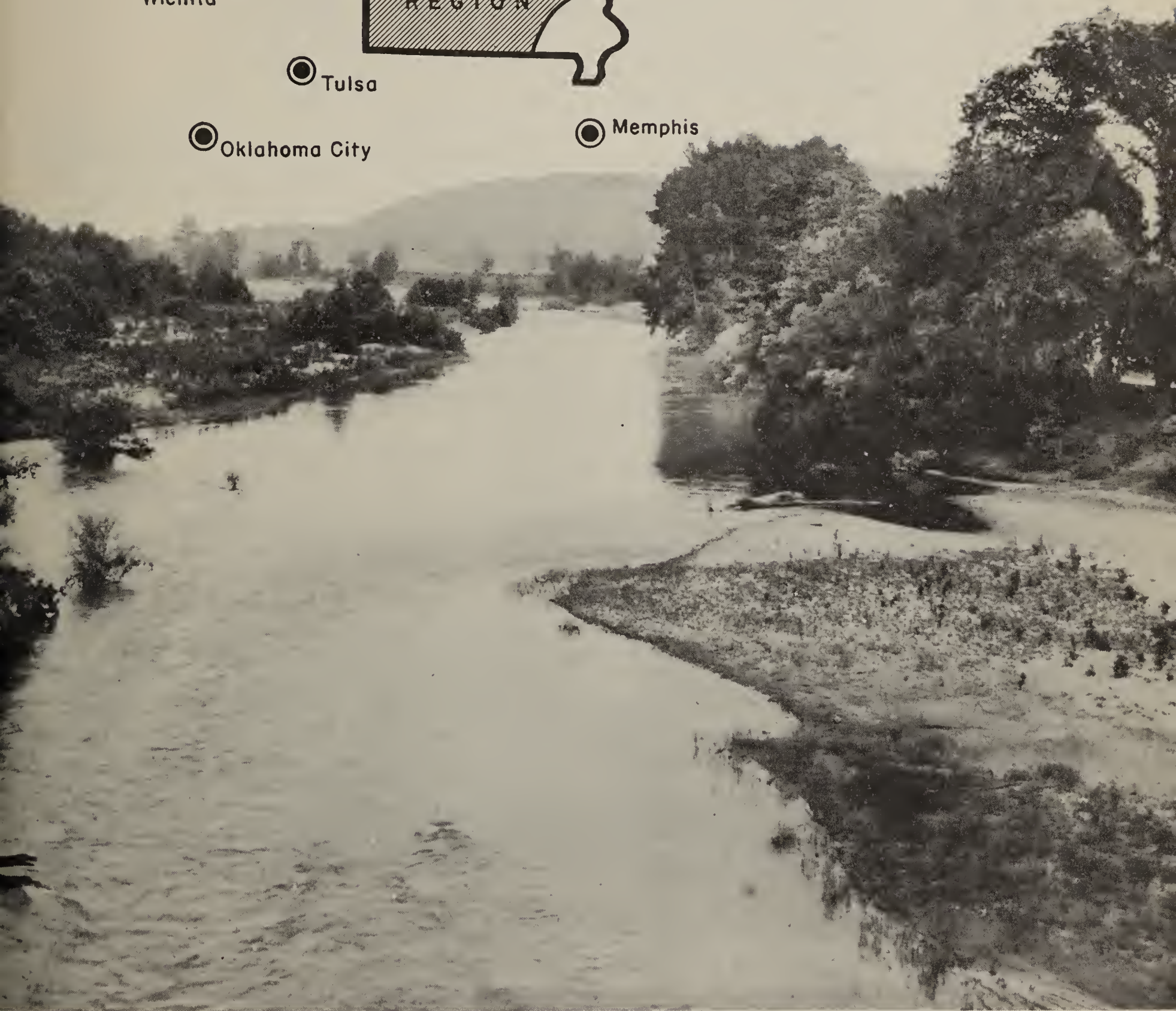
Few sections of the United States were as well suited for abundant wildlife as were the forests of Missouri under virgin conditions. A mild climate, adequate food and cover, and well-distributed water made an excellent yearlong habitat for many wildlife species. Both the testimony of old settlers and published records attest the abundance of game when the explorers and early settlers came to the State. Destructive burning, overgrazing, and settlement of better sites have combined to impoverish and restrict the available habitat. Most of the game species, including deer, turkey, squirrels, rabbits, and quail, have persisted with fluctuating abundance but their numbers are generally far below the optimum that might be maintained under good management.

In the forest sections of the State, particularly throughout the Ozarks, wildlife should be restored to a place of major economic importance. This restoration may be brought about as a result of good land management. The State Planning Board believes that the highest use of the Missouri Ozarks is for forest production and related activities. Wise planning anticipates greater protection, gradual shifting from a livestock economy to a woodsworking economy, with recreation based upon wildlife and scenic attractions as a major additional source of income. Under such a program, forest wildlife should be restored to a basis of economic importance that would insure an annual revenue to the State of many million dollars. This would not mean the dislocation of the farming and livestock enterprise. It would mean rather a gradual shift in emphasis from farm crops and livestock as main sources of income to the harvesting of forest products on those lands best suited for growing trees.

The feasibility of restoring wildlife population is being demonstrated on 23 refuges for deer and turkey well distributed through the Ozarks. It has been proved that with control of fires, regulated grazing and other good management practices, and adequate water, desirable wildlife species can be satisfactorily restored.

Streams of the Ozarks formerly provided excellent fishing. Reckless logging and burning, overgrazing and destructive farming released flood waters to tear out protective bank cover and scour channels, leaving sterile gravel beds and sand bars. Instead of a dependable flow of clear water, too many streams have an intermittent flow during dry periods and carry excessive silt and debris after heavy rains. Consequently, the capacity of the best fishing streams has greatly deteriorated. Only to the extent that good forest practices and conservative soil management are promptly put into effect on the watersheds can the destruction of the water resources be checked and fishing restored. Fortunately, if the land-use program advocated by the State and Federal agencies concerned with the problem is adopted, the watersheds will gradually heal, stream channels again will be stabilized, flood waters will be reasonably controlled, and the fishing resources may again become an important asset.





F-352246

SCENIC AREAS of the Missouri Ozarks are within easy reach of large population centers. Forest restoration would add to the natural beauty and open the way for greater recreational use. Recreational use of the forests by large numbers of visitors would provide additional income to the local people.



## RECREATIONAL USE OF THE FORESTS

Recreational use of Missouri forest lands is already comparatively high. Indicative is the Business Week estimate of tourists in Missouri in 1937 at almost 2,000,000. In 1931 the State Highway Department estimated expenditures in the State by tourists at \$21,000,000. Travel and recreational expenditures generally have increased rather steadily since that year. Money spent by tourists in Missouri in 1938 was estimated by the American Automobile Association at \$137,328,807.

Forest areas of Missouri are rich in outdoor recreational possibilities. The beauty of the Ozarks Region particularly has a tangible value in attracting tourists. The picturesquely wooded hills, rocky cliffs, great springs, extensive caves, and hunting and fishing possibilities are great potential assets.

Water resources are important to recreational use and development. As a whole, Missouri has 16,000 miles of streams and almost 700 square miles of water area in lakes and streams, of which the forested region has a large proportion. In many cases, however, the water resources have been badly used, and, as previously indicated, depletion of the forests has been accompanied by damage to the streams and to the water resources generally.

Forest restoration would enhance the recreational values of Missouri. Recreational income could and should form a very substantial part of the total income of the people living in the Ozark Region. Recreational use does not interfere with other forest uses.

Good roads lead into the Ozarks. The area is a logical recreational center for a large percentage of the population of the State and of other non-forested States bordering on Missouri. It is within easy reach of St. Louis, Kansas City, Memphis, Tulsa, Oklahoma City, and other population centers. Full development of the recreational resources as a part of a forest restoration program would attract more of the people of these cities into the open country for forest outings. The money spent in the forest region by these people would aid materially in sustaining the local population during the period of forest restoration.





F-352378

F-377267

Upper left.--PROTECTION AND MANAGEMENT of productive forests provide work for many men the year round. Upper right.--WHEN FORESTS ARE PROPERLY MANAGED and in productive condition, logs like these are the rule rather than the exception. Lower left.--RESTORATION OF MISSOURI FORESTS to productive conditions would bring increased activity and employment in specialty mills such as this stave manufacturing plant. Lower right.--MISSOURI'S FORESTS if restored to productiveness, would supply lumber for both local consumption and for shipment to other States, which would mean more work, better living, and an expanding rather than contracting tax base in forest areas.





# A FORESTRY PROGRAM

Any program of general public action calls for legislation and appropriations. A forestry program is no exception. In the following program needs for Missouri, State and Federal legislation or amendments to existing legislation will be required, and community, county, State, and Federal appropriations must be made.

It is the purpose of this publication to indicate the type of forestry program which seems needed rather than actual amounts of appropriations or exact forms of legislation. The longer such a program is delayed the greater will be the cost of forest restoration and the greater the loss in values to the people. While some adjustment may be required to meet changing conditions from time to time, there is immediate need for the following.

## The Program

1. The most important and far-reaching feature of such a forest program is the establishment of reasonable public control over forest practices on private lands sufficient to stop forest deterioration and destruction, and keep these lands reasonably productive.
2. Next, and also extremely important, the program should provide for a greatly increased scale of public acquisition - community, State, and Federal - of lands submarginal for private ownership, of critical watersheds, and of other lands in which the various types of public interest effectively can be served only through public ownership and management. In cases of Federal acquisition there should be adequate Federal contributions to the State in lieu of taxation.
3. Public cooperation should be expanded to aid private owners in such things as protection against fire, insects, and disease; reforestation; securing advice on management, on best utilization, and best markets; establishing and financing cooperatives; securing needed credit; establishing cooperative sustained-yield units.



4. Provision should be made for adequate research to serve the consuming public and all forest land owners and users. The Forest Survey (a survey of forest resources and conditions throughout the country) should be completed.
5. This program, too, should provide for more intensive development and utilization of public forests.



F-352411

**A COMMUNITY ASSET, a small mill efficiently operated.**



## SOME QUESTIONS FOR DISCUSSION

For the aid of those who are interested in talking about a forest program for Missouri the following topics are suggested:

1. Why are Missouri's forest lands important to the economic welfare of all her people, and why should all the people, through their Government, aid in forest restoration?
2. What are some of the results of forest depletion evident in Missouri forest communities?
3. What motives or activities of men have been mainly responsible for the depletion of the forest resources in the Ozarks?
4. Why are the forests and woodlands of especial importance to the rural population and how can farmers benefit both directly and indirectly from forest restoration and management?
5. Why are the commercial forests likely always to be confined largely to the Ozark Region?
6. Why are large areas of Missouri forest lands best suited to public rather than to private ownership? Can the public manage these lands better than private owners or are there other reasons that make public ownership more desirable?
7. Why is the management and regulation of grazing so much a part of forest restoration in Missouri? Can forest lands in Missouri be grazed without damage to the timber stands?
8. Why are forests vital to the success of any program of wildlife restoration and conservation? Why will it be impossible to restore the wildlife of Missouri to its original abundance?
9. What questionable practice contributes most to the forest-fire hazard in Missouri and why is fire control so essential to forest restoration? Why is forest fire protection largely a public responsibility?
10. How do forests affect stream flow and soil erosion? Why are these especially important in the Ozark region?
11. Will Missouri ever produce all of the lumber consumed in the State? If not, why not?
12. What location advantage does Missouri have as a forest producing State? Is location important from the standpoint of forest use?



MATERIALS FOR FURTHER READING

U. S. Department of Agriculture

For sale by the Superintendent of Documents, Washington, D.C.

Farmers' Bulletins:

Forestry and Farm Income - No. 1117	\$ .05
Care and Improvement of the Farm Woods - No. 1177	.05
Measuring and Marketing Farm Timber - No. 1210	.05
Selling Black Walnut Timber - No. 1459	.05
Arbor Day - Its Purpose and Observation - No. 1492	.05
Transplanting Trees and Shrubs - No. 1591	.05
Shortleaf Pine - No. 1671	.05
Growing Black Locust Trees - No. 1628	.05
Black Walnut for Timber and Nuts - No. 1392	.05
Game Management on the Farm - No. 1759	.05
Growing and Planting Hardwood Seedlings - No. 1123	.05
Forest Farming - No. 1794	.05

Miscellaneous Publications:

Forest Trees and Forest Regions - No. 217	.15
Living and Forest Lands - No. 388	.10
Forestry and Permanent Prosperity - No. 247	.05
State Forests for Public Use - No. 373	.10
Our Forests, What They Are and What They Mean to Us - No. 162	.05

Leaflets:

Small Trees Wasteful to Cut for Sawtimber - No. 55	.05
The Farm Woods a Savings Bank - No. 29	.05
Protect Hardwood Stands from Grazing - No. 86	.05
How to Cut Southern Farm Timber for Steady Profit - No. 153	.05
Planting Black Walnuts - No. 84	.05

Unnumbered Publications:

Taming our Forests - Forest Service	.15
What Forests Give - Forest Service	.15
Community Forests - Forest Service	.10
Products of American Forests - Forest Service	.20

University of Missouri, Agricultural Extension Service, Columbia, Mo.

Forest Restoration in Missouri - Bulletin 392	
How to Plant Small Trees - Circular 342	
Tree Planting for Erosion Control - Circular 345	
Improving Food and Cover for Wildlife on Missouri Farms - Circular 348	

The Missouri Conservation Commission, Jefferson City, Mo.

Forest Trees of Missouri - Conservation Bulletin No. 20	
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SOURCES OF FORESTRY AND CONSERVATION INFORMATION IN MISSOURI

Governor: Forrest C. Donnell - Term expires: January 1945.

Legislature meets: First Wednesday after January 1, in odd years.

State Planning Board: William Anderson, State Office Bldg.,  
Jefferson City, Mo.

State Land Use Planning Committee: J. W. Burch, Chairman,  
College of Agriculture, University of Missouri, Columbia, Mo.

Director, Conservation Commission: I. T. Bode, Jefferson City, Mo.

State Forester: George O. White, Jefferson City, Mo.

State Agricultural Experiment Station: M. F. Miller, Director,  
College of Agriculture, University of Missouri, Columbia, Mo.

State Extension Service: J. W. Burch, College of Agriculture,  
University of Missouri, Columbia, Mo.

Extension Forester: Robert L. Curtis, Missouri State College,  
Columbia, Mo.

Soil Conservation Service: Kenyon G. Harman, State Conservationist,  
Columbia, Mo.

FORESTRY SECTION, MISSOURI CONSERVATION COMMISSION REGISTER<sup>8/</sup>

Conservation Commission ... I. T. Bode, Director, George O. White, State  
Forester, Monroe Bldg., Jefferson City, Mo.

Protection Districts: Daniel Boone, Warrenton; Lake of the Ozarks,  
Camdenton; Meramec, Sullivan; Eminence, Eminence; Deer Run, Ellington;  
Sam Baker, Piedmont; Kirksville, Kirksville.

NATIONAL FOREST REGISTER<sup>8/</sup>

CLARK ..... Forest Supervisor, Ironton, Mo.

Ranger Districts: Salem, Centerville, Doniphan, Winona, Frederick-  
town, Poplar Bluff, Potosi.

MARK TWAIN ..... Forest Supervisor, U. S. Post Office and  
Customhouse, Springfield, Mo.

Ranger Districts: Willow Springs, Rolla, Ava, Cassville, Houston,  
Licking Nursery.

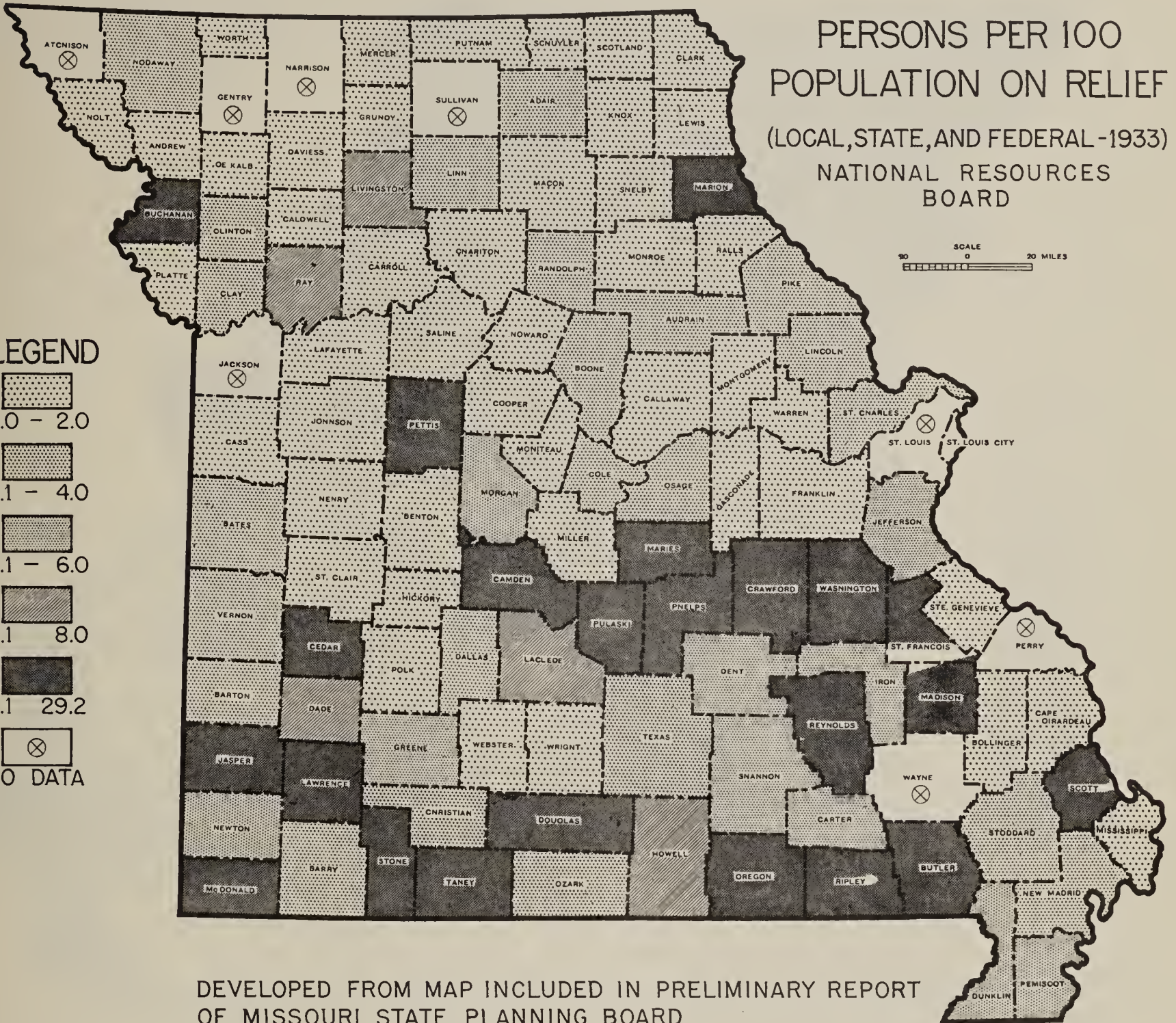
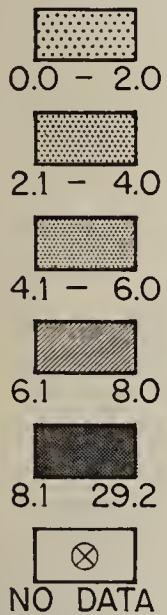
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<sup>8/</sup> As of 1943.



PERSONS PER 100  
POPULATION ON RELIEF  
(LOCAL, STATE, AND FEDERAL - 1933)  
NATIONAL RESOURCES  
BOARD

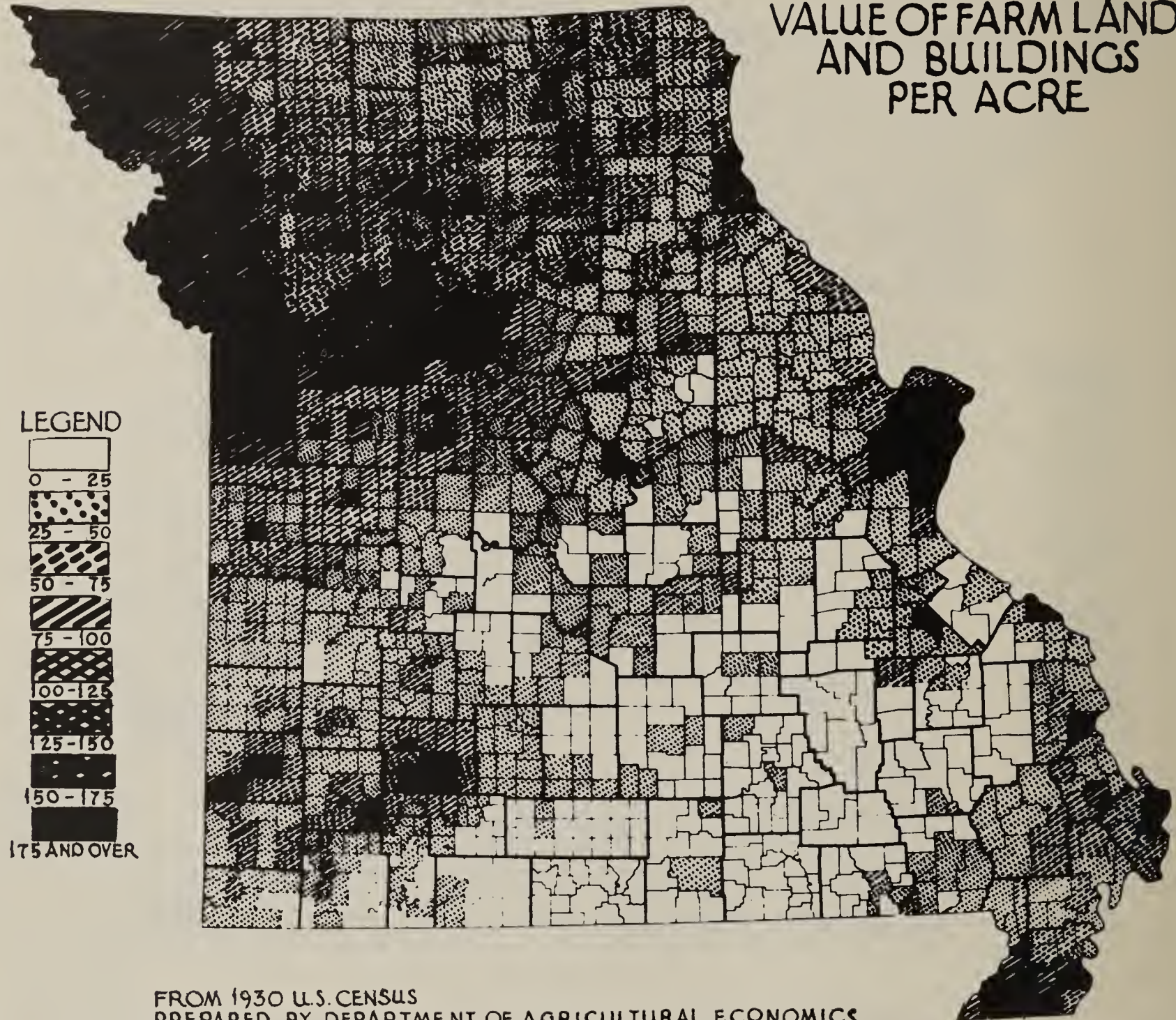
LEGEND



While a rather wide range exists in the proportion of the county populations on relief in 1933, a marked tendency for the heavier relief loads to concentrate in the poorer land areas is evident. The data include not only rural people on relief but urban people as well and hence are not an entirely accurate reflection of the agricultural relief situation. Since ability on the part of local leaders determines to some extent the amount of State and Federal monies allotted to a particular county the map is not an entirely accurate reflection of the relief needs of different areas.



# MISSOURI VALUE OF FARM LAND AND BUILDINGS PER ACRE



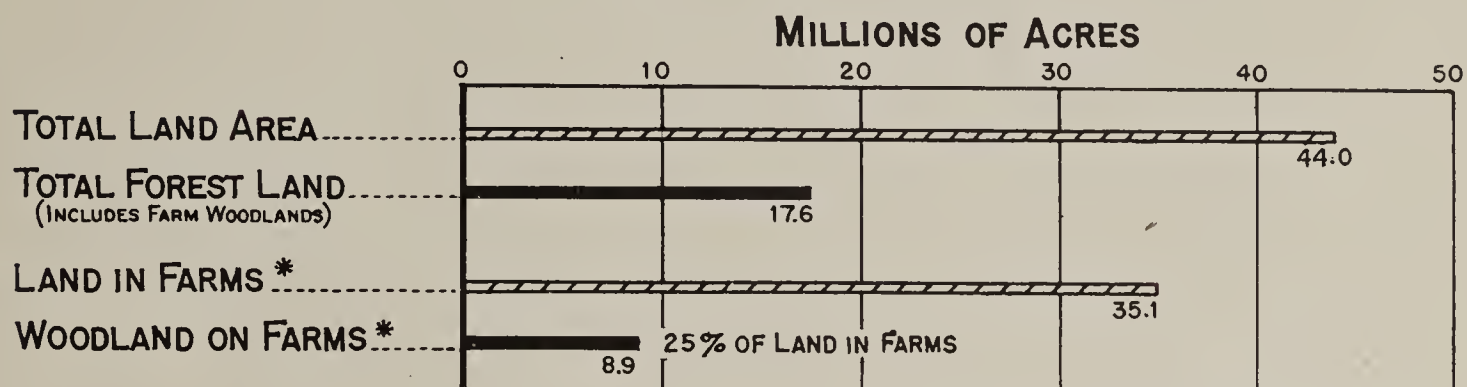
This map shows the value per acre of land and buildings of areas which the census classed as farm land in 1930. It does not, therefore, take into account the wooded areas or waste areas outside the confines of individual farms. A rather close correlation between the map and the quality of soil as indicated on the Soil Classification map is again noted. The most valuable farm lands are found in the richer agricultural sections of the State.

The influence of urban centers on the value of farm land is clearly indicated on this map. Areas immediately around St. Louis, Kansas City, St. Joseph, and Springfield comprise farm land of the highest value.

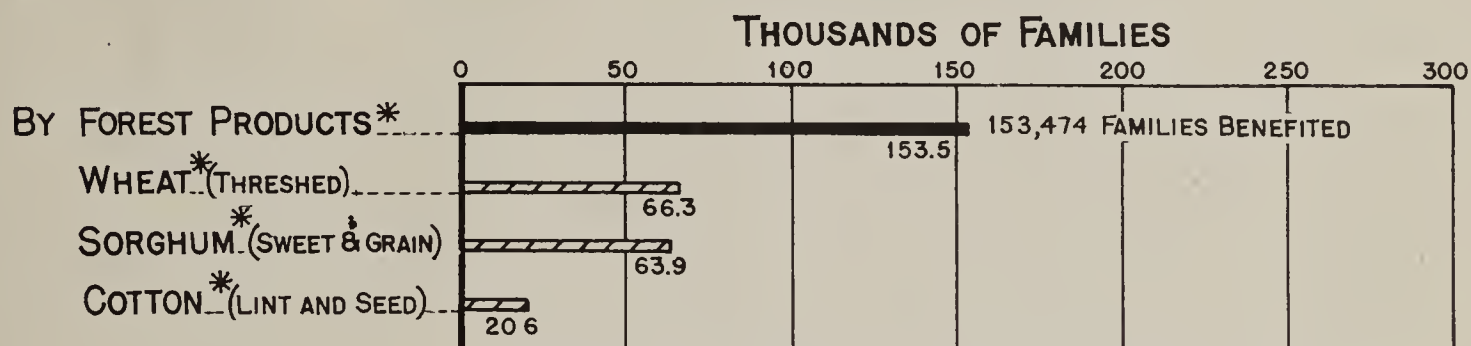


# FARM WOODLANDS OF MISSOURI

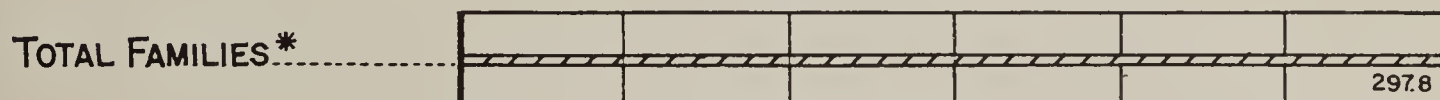
## LAND AREAS IN STATE



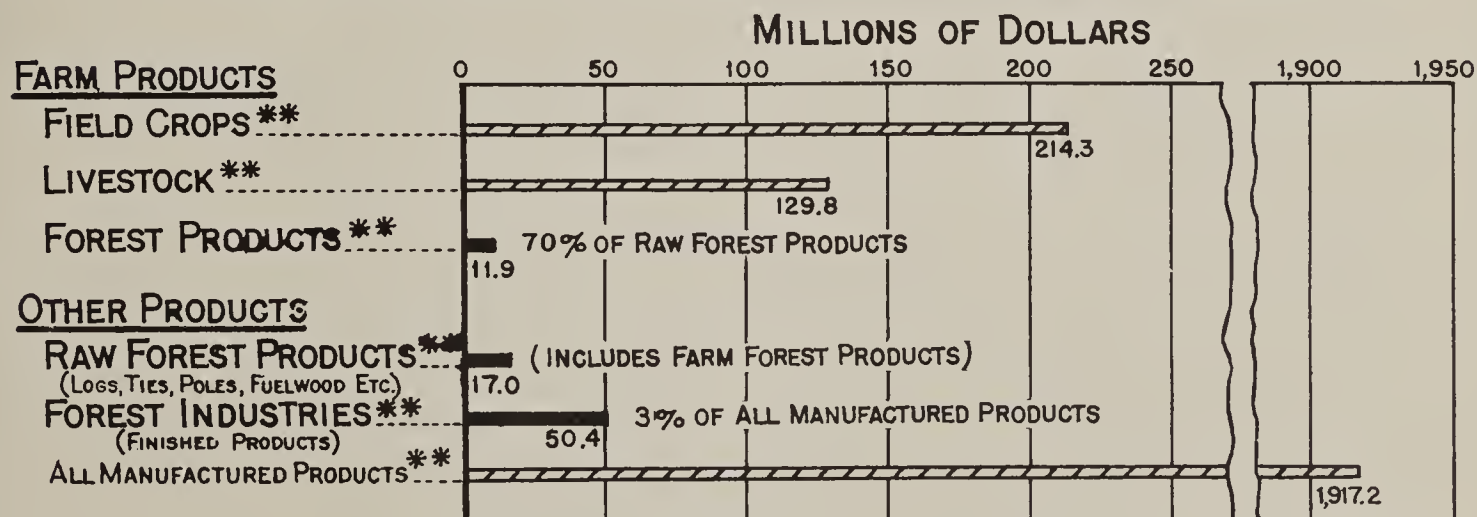
## FARM FAMILIES BENEFITED



## FARM FAMILIES IN STATE



## COMPARISON OF PRINCIPAL INCOME SOURCES



\* 1935 CENSUS

\*\* 1930 CENSUS

U. S. DEPARTMENT OF AGRICULTURE  
FOREST SERVICE  
Division of Private Forestry



